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MARK S. SVAT
FAY SHARPE FAGAN MINNICH & MCKEE LLP
1100 SUPERIOR AVENUE
SEVENTH FLOOR
CLEVELAND, OH 441142518

EXAMINER	
CHU, CHRIS C	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/469,122	Applicant(s) LEMMI ET AL.	
	Examiner Chris C. Chu	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 6, 8, 9 and 11 - 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 6, 8, 9 and 11 - 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Prosecution Application

1. The request filed on December 2, 2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/469,122 is acceptable and a CPA has been established. An action on the CPA follows.

2. The amendment filed on March 26, 2002 has been received and entered in this office action.

Claim Objections

3. Claim 3 is objected to because of the following informalities: line 3 of claim 3 "least one of, some of the lasers of the laser array" should be --least one of the single light source, some of the lasers of the laser array-- or -- least one of a laser or some of the lasers of the laser array --. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 3, it cannot be determined what applicant regards as "least one of, some of the lasers of the laser array."

In claim 24, the term "high" is a relative term which renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 ~ 6, 8, 11, 16, 17, 19, 20, 22 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitamura et al.

Regarding claim 1, Kitamura et al. discloses in Fig. 4 and column 6, lines 20 ~ 50 a hybrid device comprising:

- a substrate (60);
- a micro-spring interconnect (66) formed on the substrate, the micro-spring interconnect including,
    - an elastic material that is operatively associated with a surface of the substrate including,
    - an anchor portion (end portion of 66) fixed to the substrate, and
    - a free portion (between the end portion of 66) spaced from the substrate; and
- a sensor (2) formed on the substrate, the sensor including an active layer and contacts, said active layer configured to sense light (light from 18) and be at least partially transparent to light at selected wavelengths,
- said micro-spring interconnect and said sensor being integrated on the substrate.

Regarding claim 2, Kitamura et al. discloses in Fig. 4 the hybrid device further including at least one of a single light source (18), an array of lasers, and an array of light emitting diodes (LEDs), positioned to emit light at least a portion of light through at least a portion of the sensor.

Regarding claim 3, Kitamura et al. discloses in Fig. 4 the sensor being designed and aligned with at least one of the laser array and the LED array, to receive the emitted light from at least one of, some of the lasers of the laser array and some of the LEDs of the LED array.

Regarding claim 4, Kitamura et al. discloses in Fig. 4 the sensor, including the active layer, being designed and aligned with at least one of the laser array and the LED array to

receive and pass, through the active layer, an amount of the emitted light from a portion of at least one of the laser array and the LED array sufficient for a printing operation.

Regarding claim 5, Kitamura et al. discloses in Fig. 4 the substrate being designed and aligned with at least one of the laser array and the LED array to receive and pass, through the active layer, an amount of the emitted light from a portion of at least one of the laser array and the LED array sufficient for a printing operation.

Regarding claim 6, Kitamura et al. discloses in Fig. 4 and column 3, lines 59 ~ 60 the sensor being an array of sensors.

Regarding claim 8, Kitamura et al. discloses in Fig. 4 the sensor (2) and the micro-spring interconnect (66) being comprised of materials which allow for integration of the micro-spring interconnect and the sensor on the single substrate during a manufacturing process, wherein at least one of the materials for the micro-spring interconnect and the sensor is the same.

Regarding claim 11, Kitamura et al. discloses in Fig. 4 and column 6, lines 20 ~ 50 the elastic material being a stressed metal layer having sub-layers of differing stress gradients.

Regarding claim 16, Kitamura et al. discloses in Fig. 4 the micro-spring interconnect being a plurality of micro-spring interconnects.

Regarding claim 17, Kitamura et al. discloses in Fig. 4 and column 6, lines 20 ~ 50 a hybrid device comprising:

- at least one of a laser or LED (18) device capable of emitting light at a certain wavelength;
- a substrate (60);

- a micro-spring interconnect (66) formed on the substrate, the micro-spring interconnect including,
    - an elastic material operatively associated with a surface of the substrate including,
    - an anchor portion (end portion of 66) fixed to the substrate, and
    - a free portion (between the end portion of 66) spaced from the substrate; and
- a sensor (2) formed on the substrate, in an integrated manner, with the micro-spring interconnect, the sensor including an active layer and contacts,
- wherein said substrate and said sensor, including the active layer, are at least partially transparent to light at the wavelength emitted by at least one of the laser or the LED device; and
- said at least one of the laser or the LED device (18) and said substrate with said sensor and said at least one micro-spring interconnect being separately fabricated and aligned, such that at least a portion of the light emitted directly by the at least one of the laser and LED device is directed through at least a portion of the substrate and the active layer of the sensor.

Regarding claim 19, Kitamura et al. discloses in Fig. 4 the sensor being sized such that each of the lasers or LEDs emit light at least partially through the sensor.

Regarding claim 20, Kitamura et al. discloses in Fig. 4 and column 3, lines 59 ~ 60 the sensor being a plurality of sensors, sized such that a sub-group of the lasers or the LEDs may emit light through selected ones of the sensors.

Regarding claim 22, Kitamura et al. discloses in Fig. 4 and column 6, lines 20 ~ 58 a calibration/printing system comprising:

- a sensor (2) configuration including a sensor element integrated on a substrate with a plurality of micro-spring interconnects (66);
- a light source (18) aligned with the sensor configuration such that at least a portion of the light directly from the light source is sensed and passed through the active layer of the sensor and at least a first of the micro-spring interconnects is in physical contact with a portion of the light source; and
- a driver chip (4) aligned with the sensor configuration and the light source such that at least a second of the micro-spring interconnects is in physical contact with a portion of the driver chip, and a communication path is formed between the light source and the driver chip by the at least first and second micro-spring interconnects.

Regarding claim 26, Kitamura et al. discloses in Fig. 4 and column 6, lines 20 ~ 50 a hybrid device comprising:

- a micro-spring interconnect structure (66); and
- at least two devices electrically connected (2 and 18) by the interconnect structure wherein,
    - one of the devices is a sensor (2), the sensor including an active layer and contacts, said active layer sensing light, and
    - another one of the devices is at least one of a single light source (18), an array of lasers, and an array of light emitting diodes (LEDs), positioned to emit light at least partially through the sensor.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 9, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al. in view of Yamazaki et al.

Regarding claim 9, Kitamura et al. discloses the claimed invention except for the sensor is comprised of, a first transparent/conductive layer; an active layer on top of the first transparent/conductive layer; a second transparent/conductive layer on top of the active layer; a passivation/release layer located over at least the first transparent/conductive layer and the second transparent/conductive layers; and a metal layer connecting to the first and second transparent/conductive layers through the vias, wherein the metal layer acts as signal lines to receive and carry signals from the active layer. However, Yamazaki et al. teaches in Fig. 2(D) a sensor being comprised of, a first transparent/conductive layer (2); an active layer (3) on top of the first transparent/conductive layer (see Fig. 2(D)); a second transparent/conductive layer (23) on top of the active layer (see Fig. 2(D)); a passivation/release layer (21) located over at least the first transparent/conductive layer and the second transparent/conductive layers (see Fig. 2(D)); and a metal layer (5) connecting to the first and second transparent/conductive layers through the

vias, wherein the metal layer acts as signal lines to receive and carry signals from the active layer. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Kitamura et al. by including the sensor as taught by Yamazaki et al. The ordinary artisan would have been motivated to modify Kitamura et al. in the manner described above for at least the purpose of eliminating short circuit current paths in the sensor.

Regarding claim 12, Yamazaki et al. discloses in column 3, lines 31 ~ 47 the sensor further includes an absorption layer, located immediately over the sensor, wherein the absorption layer absorbs unwanted light prior to being detected by the active layer.

Regarding claim 13, Yamazaki et al. discloses in column 3, lines 11 ~ 21 the active layer being a three layer element, wherein a first layer is a n+ doped amorphous silicon, the first layer being one of, but not limited to n+ phosphorous-doped amorphous silicon and n+ arsenic-doped silicon; wherein a second layer is an intrinsic amorphous silicon; wherein a third layer is a p+ doped amorphous silicon, the third layer being, but not limited to, p+ boron-doped amorphous silicon. Further, since Yamazaki et al. does not limit the p-type semiconductor layer and crystalline semiconductor layer to any particular or specific semiconductor material, his disclosure encompasses all well known semiconductor layer's including "n+ doped amorphous silicon, n+ phosphorous-doped amorphous silicon, n+ arsenic-doped silicon, p+ doped amorphous silicon, and p+ boron-doped amorphous silicon."

10. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al. in view of Sekiguchi.

Regarding claim 14, Kitamura et al. discloses the claimed invention except for a switch is located, between the sensor and the substrate, such that the sensor is an active semi-continuous sensor. However, Sekiguchi teaches in Fig. 6 a switch (100) being located, between the sensor and the substrate, such that the sensor is an active semi-continuous sensor. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Kitamura et al. by including a switch between the sensor and the substrate as taught by Sekiguchi. The ordinary artisan would have been motivated to modify Kitamura et al. in the manner described above for at least the purpose of increasing efficient utilization of the sensor. Further, as to the language on lines 2 ~ 3, the phrase "such that the sensor is an active semi-continuous sensor" is functional language which does not differentiate the claimed apparatus over Kitamura et al.

Regarding claim 15, Sekiguchi discloses in column 11, line 31 the switch being a thin-film-transistor (TFT).

11. Claims 18, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al. in view of Hammond.

Regarding claim 18, Kitamura et al. discloses the claimed invention except for at least a portion of the laser or the LED device being a plurality of lasers or LEDs formed in a laser or LED array. However, Hammond teaches in column 1, lines 29 ~ 38 at least a portion of the laser or the LED device being a plurality of lasers or LEDs formed in a laser or LED array. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Kitamura et al. by using the LED device being a plurality of LEDs as taught by

Hammond. The ordinary artisan would have been motivated to modify Kitamura et al. in the manner described above for at least the purpose of making the length of a row as long as the image that is to be formed an LED printbar can produce a desired image line by line (column 1, lines 31 ~ 33).

Regarding claim 21, Kitamura et al. discloses in Fig. 4 the micro-spring interconnect being in electrical contact with the printbar (LED). Kitamura et al. does not disclose the LED being a plurality of LEDs and arranged as a printbar. However, Hammond teaches in column 1, lines 29 ~ 38 the LEDs being a plurality of LEDs and arranged as a printbar. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Kitamura et al. by using the LED device being a printbar as taught by Hammond. The ordinary artisan would have been motivated to modify Kitamura et al. in the manner described above for at least the purpose of making the length of a row as long as the image that is to be formed an LED printbar can produce a desired image line by line (column 1, lines 31 ~ 33).

Regarding claim 25, Kitamura et al. discloses the claimed invention except for the light source being a printbar that has an array of light sources. However, Hammond teaches in column 1, lines 11 ~ 38 the light source being a printbar that has an array of light sources, and wherein the printbar is controlled to activate the light sources in a sequential manner to obtain calibration data to be stored in a driver. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Kitamura et al. by using the light source being a printbar and an array form as taught by Hammond. The ordinary artisan would have been motivated to modify Kitamura et al. in the manner described above for at least the purpose of

making the length of a row as long as the image that is to be formed an LED printbar can produce a desired image line by line (column 1, lines 31 ~ 33).

12. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al. in view of Rajeswaran.

Regarding claim 23, Kitamura et al. discloses the claimed invention except for the driver chip further include: a comparator for comparing a sensor readout current from the sensor and a reference current; a converter arrangement which converts the output of the comparator into digital data representing characteristics of the light source; a set of low frequency shift registers configured to receive and store the digital data; an activation signal selectively supplied to the light source, the activation signal designed to control operation of the light source to selectively emit light therefrom; a driver designed to interpret the digital data as activation signal correction information for the activation signal; a high frequency shift-register configured to receive and store digital image data from a source external to the driver chip; and an enable/disable output signal from the high frequency shift-register to selectively supply the activation signal and light source correction information to the light source, whereby an amount of light emitted by the light source is controlled. However, note Fig. 12 of Rajeswaran, where the reference shows that the driver chip further include: a comparator (53) for comparing a sensor readout current from the sensor and a reference current (see Fig. 12); a converter (57) arrangement which converts the output of the comparator into digital data representing characteristics of the light source (column 9, lines 48 ~ 54); a set of low frequency shift registers (52) configured to receive and store the digital data; Thus, it would have been obvious to one of ordinary skill in the art at the time when

the invention was made to modify Kitamura et al. by including a comparator, a converter, and a registers as taught by Rajeswaran. The ordinary artisan would have been motivated to modify Kitamura et al. in the manner described above for at least the purpose of increasing efficient of the device. Further, as to the language on lines 13 ~ 24, the phrase "an activation signal selectively supplied to the light source, the activation signal designed to control operation of the light source to selectively emit light therefrom; a driver designed to interpret the digital data as activation signal correction information for the activation signal; a high frequency shift-register configured to receive and store digital image data from a source external to the driver chip; and an enable/disable output from the high frequency shift-register to selectively supply the activation signal and light source correction information to the light source, whereby an amount of light emitted by the light source is controlled" is functional language which does not differentiate the claimed apparatus over Kitamura et al. Furthermore, it has been held that the functional "whereby" statement does not define any structure and accordingly can not serve to distinguish. In re Mason, 114 USPQ 127, 44 CCPA 937 (1957).

Regarding claim 24, Rajeswaran discloses in column 7, lines 48 ~ 60 the digital image data from the source external to the driver chip being supplied as high frequency bit stream data.

Response to Arguments

13. Applicant's arguments with respect to claims 1, 4, 5, 9, 11, 17, 22 and 26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
May 29, 2003

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800